



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/977,972	10/17/2001	Yutaka Kagawa	35.C15881	4292

5514 7590 09/03/2003

FITZPATRICK CELLA HARPER & SCINTO  
30 ROCKEFELLER PLAZA  
NEW YORK, NY 10112

EXAMINER

LORENZO, JERRY A

ART UNIT	PAPER NUMBER
----------	--------------

1734

DATE MAILED: 09/03/2003

6

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

09/977,972

Applicant(s)

KAGAWA ET AL.

Examiner

Jerry A. Lorengo

Art Unit

1734

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-28 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-28 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

**Priority under 35 U.S.C. §§ 119 and 120**

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 4. 6) ☐ Other:

## DETAILED ACTION

(1)

### *Claim Rejections - 35 USC § 103*

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-3, 14, 15-17 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 6,347,862 to Kanno et al. in view of JP 06-320739 to Shimokata et al.

Regarding applicant claims 1, 14, 15 and 28, Kanno et al. disclose a liquid discharge head incorporating a piezoelectric film-type actuator and a method for its manufacture comprising the steps of (Figure 5A; column 7, lines 52 to column 8, line 49):

- (1) Providing an intermediate transfer member;
- (2) Forming a piezoelectric film assembly on the intermediate member;

Art Unit: 1734

- (3) Forming a vibration (oscillating) plate on the piezoelectric film assembly;
- (4) Providing a liquid discharge assembly having compression chambers and ink chambers formed therein;
- (5) Bonding the piezoelectric film assembly and vibration plate carried on the intermediate transfer member to the liquid discharge assembly; and
- (6) Peeling off the intermediate transfer member from the piezoelectric film assembly.

Although Kanno et al. do not specifically disclose, as per applicant claims 1 and 15, that the vibration (oscillating) plate is preliminarily connected to the liquid discharge assembly having compression chambers and ink chambers formed therein in the form of an oscillating plate structural member to which the piezoelectric film is bonded and transferred to from the intermediate transfer member, it would have been obvious to one of ordinary skill in the art at the time of invention to do so motivated by the fact that Shimokata et al., also drawn to methods for the manufacture of a liquid discharge head incorporating a piezoelectric film-type actuator, disclose that it is an art recognized alternative to bond and transfer the piezoelectric film 3 from a intermediate transfer member 1 to a oscillating plate structural member comprising an oscillating plate 12 and a liquid discharge assembly having compression chambers and ink chambers 10,11 formed therein (Figure 8; abstract; paragraphs [0007] to [0017]).

Regarding applicant claims 2, 3, 16 and 17, Kanno et al. disclose that the piezoelectric film is a PZT film containing lead, zirconium and titanium (Figure 5A; column 6, lines 59-67; column 7, line 66 to column 8, line 14) which is patterned prior to transfer (column 8 lines 15-21).

(2)

Claims 5-10, 12, 13, 19-24, 26 and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as combined in section (1), above, in view of U.S. Patent Nos. 6,335,263 ('263) and 6,071,795 ('795), both to Cheung et al.

Although the references as combined in section (1), above, disclose that the piezoelectric film may be bonded and transferred to the oscillating plate structural method through the use of adhesive bonding, they do not specifically disclose the bonding methodologies utilized in applicants claims 5 and 19. Although they disclose that the intermediate transfer member, comprised of, for example, MgO, may be removed by etching, they do not specifically disclose,

Art Unit: 1734

as per applicant claims 6-10 and 20-24, that separation is achieved through the use of laser irradiation through the intermediate transfer member side. As such, they are also silent as to the formation of a porous layer, as per applicant claims 12, 13, 26 and 27, between the intermediate transfer member and the piezoelectric film.

Regarding applicant claims 5 and 19, it would have been obvious to one of ordinary skill in the art at the time of invention to substitute the adhesive bonding of Kanno et al. and Shimokata et al. with low temperature pressure bonding using a metal bond interface motivated by the fact that '263, also drawn to methods for the transfer of a thin semiconductor film from a donor substrate to an acceptor substrate, disclose that such a method is effective for achieving a bond having low electrical and thermal resistance and also allow the formation of a bonding layer that is thinner than the thin film to be transferred such that its properties do not dominate those of the transferred thin film (column 3, lines 11-49; column 1, lines 36-54).

Regarding applicant claims 6 and 20, it would have also been obvious to one of ordinary skill in the art at the time of invention to substitute peeling of the intermediate transfer member by way of etching, as taught by Kanno et al., through the use of a laser irradiated through the intermediate transfer layer, as taught by '263 (column 3, line 55 to column 4, line 8) motivated by the fact that '795 discloses that intermediate transfer member removal by etching or via laser irradiation are function equivalents for the removal of intermediate transfer substrate (column 5, lines 22-43), such as the MgO intermediate transfer substrate material taught by Kanno et al. This reference, '795, also discloses that the method is also usable in the formation and transfer of PZT films, such as those PZT film utilized to for the piezoelectric films utilized in Kanno et al. (column 7, lines 28-45).

Regarding applicant claims 7, 9, 21 and 23, both '263 and '795 disclose that the laser utilized may comprise an excimer laser at 248 nm with an attenuation of between 20 to 30% in the intermediate transfer member ('263 at column 5, lines 48-51 and '795 at column 4, line 54 to column 5, line 8).

Regarding applicant claims 12, 13, 26 and 27, '795 disclose that when a PZT film (such as the piezoelectric film utilized by Kanno et al.) is being transferred from the intermediate transfer member to the acceptor substrate, the laser irradiation causes the formation of a porous

Art Unit: 1734

layer between the PZT film and the intermediate transfer member composed of PbO, a metal oxide (column 7, lines 28-4).

Although neither '263 nor '795 specifically disclose the type of laser capable of the effects set forth in applicant claims 8, 10, 22 and 24, it would have been obvious to one of ordinary skill in the art at the time of invention to utilize an infrared laser in place of the excimer laser taught by '263 and '795, motivated by the fact that the skilled artisan would have been appreciative of the fact that the particular nature of the laser employed, the lasing media and/or physical properties would have been obvious to one having ordinary skill in the art based upon considerations of cost, availability, or mode of operation. Typically, selection of the proper laser may be achieved in the course of routine experimentation, by reference to standard technical literature, or through consultation with industrial or specialty suppliers.

(3)

Claims 4 and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as combined in section (1), above, in further view of U.S. Patent No. 6,013,970 to Nishiwaki.

Kanno et al., as set forth in section (1), above, disclose that the PZT piezoelectric film has a thickness of about 3 $\mu$ m (column 8, lines 1-30). Although they do not specifically disclose the degree of surface roughness exhibited by this PZT film, it would have been obvious to one of ordinary skill in the art at the time of invention that the PZT films formed by Kanno et al. would exhibit such a surface roughness motivated by the fact that Nishiwaki et al., also drawn to methods for the formation of epitaxial PZT films for use in the formation of ink-jet fluid heads, disclose that piezoelectric PZT film having thicknesses from 1 to 10  $\mu$ m have a surface roughness of no more than 1 $\mu$ m (abstract).

(4)

Claims 11 and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over the references as combined in section (2), above, in further view of U.S. Patent No. 6,013,567 to Henley et al.

The references, '263 and '795, as set forth in section (2), above, disclose that the intermediate transfer substrate is peeled from the PZT film adhered to the target substrate after being irradiated with the laser. Although they do not specifically disclose, as per applicant claims

Art Unit: 1734

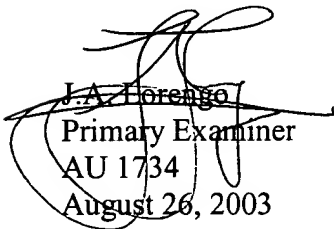
11 and 25, that the peeling is facilitated by the use of a fluid flux discharged between the intermediate transfer member and the PZT film, the skilled artisan would have appreciated the applicability of such a delamination methodology to this case motivated by the fact that Henley et al., also drawn to methods for the delamination of thin patterned films from a donor substrate disclose that a fluid flux imposed upon the interface is an effective and nondestructive way of ensuring efficient delamination (abstract; Figure 6B; column 2, lines 1-17; column 6, line 38 to column 7, line 50).

(5)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jerry A. Lorengo whose telephone number is (703) 306-9172. The examiner can normally be reached on Monday through Friday, 8:30 A.M. to 5:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Crispino can be reached on (703) 308-3853. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 305-7115 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

  
J.A. Lorengo  
Primary Examiner  
AU 1734  
August 26, 2003